

Japanese Patent Laid-open No. HEI 11-266180 A

Publication date : September 28, 1999

Applicant : Fujitsu Limited

Title : ARRAY ANTENNA SYSTEM OF RADIO STATION

[ABSTRACT]

[OBJECT]

The present invention intends to improve the quality of transmission or the reception characteristics.

[SOLVING MEANS]

In an array antenna system of a radio station of a CDMA mobile communication, a beam former 12 performs beam forming for a multipath signals received by a plurality of antenna elements of an array antenna 11 so as to form a plurality of electrical beams B_1 - B_4 , and inputs the beams into inverse diffusion/delay adjusting sections (finger sections) 13_1 - 13_k provided to each paths of the multipath. Each of the finger sections performs the inverse diffusion for each of the input beams, and a beam selector 15 selects inverse diffusion signals from all the beams through all the paths. A synthesizing section 17 weightedly synthesizes the selected inverse diffusion signals, and a determining section 18 performs the determination of input data on the basis of the synthesized signal.

[0016]

Title : Experimental Evaluation on Coherent Adaptive
Array Antenna Diversity for DS-CDMA Reverse Link

Author : S.Tanaka, A.Harada, M.Sawahashi, and F.Adachi

Publication date : September 1998

Abstract

The characteristics of pilot symbol-assisted coherent adaptive array antenna diversity (PSA-CAAD) in W-CDMA uplinks were subjected to transmission experiments in a multi-path phasing environment, using a hardware phasing simulator. Results of evaluation confirmed that the null can be generated with high precision toward the direction of the interfering users, using four antennas and three users (two interference users). The use of adaptive array antenna diversity reception reduced SIR by 8dB while satisfying an average BER = 10^{-3} . It was demonstrated that the suppression effect on interference from users conducting high-transmission-strength, high-bit-rate data transmission was extremely strong in comparison with antenna diversity.

Keywords:

DS-CDMA, adaptive array antenna, pilot channel estimation, interference suppression, mobile radio

Title : Laboratory Experiments on Coherent Rake Receiver
in Broadband DS-CDMA Mobile Radio

Author : Takehiro Ikeda, Koichi Wkawa, Mamoru Sawahashi
and Fumiyuki Adachi

Publication : October 1999

Abstract

An indoor transmission experiment was conducted to evaluate Rake path diversity and antenna diversity effects and the impact on path delay time in a single-carrier broadband DS-CDMA (B-CDMA) system with spread bandwidth of 100 MHz (chip rate 81.92Mcps), using experimental equipment having $SF \times 2RAKE$ fingers (SF = spreading factor). Results of the experiment demonstrated that, in a multi-path model of average strength receiving independent Raleigh phasing fluctuation, the Rake path diversity effect for path number $L = 6$ satisfies average $BER = 10^{-3}$ at the least requisite value for E_b/N_0 , when using two-branch antenna diversity with $f_D = 80\text{Hz}$ and $SF = 32$. It was also demonstrated that average $BER = 10^{-3}$ (10^{-6}) with average $E_b/N_0 =$ approximately 4.0 (6.8) dB can be achieved under these conditions. Furthermore, it was confirmed that extremely high-quality transmission of average $BER = 10^{-6}$ or less can be achieved at an information bit rate of 20.36Mbps, using branch antenna diversity with $SF = 4$ and two-finger Rake reception.